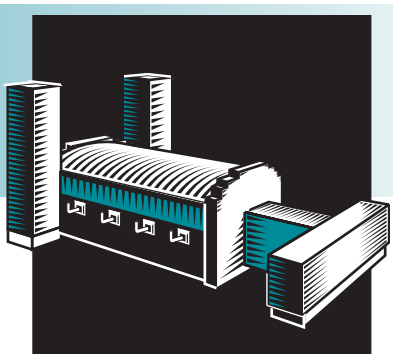
GLASS
Project Fact Sheet



Rotary Electric Glass Furnace

Precision Molding of Optical Blanks in Rotary Electric Furnaces

Benefits

- Significant energy savings compared to conventional gas-fired furnaces by increasing energy efficiency from 4% to about 71%
- Reduces air emissions, including greenhouse gases, because of reduced energy consumption
- Improves product turnaround time and quality
- Reduces labor costs because of automation
- Allows for a cleaner, safer work environment
- Doubles production capacity without additional investment
- Allows U.S. optical blank manufacturers to again compete with global producers

Applications

More than a thousand types of glass optical blanks are produced for the photonics industry, including lasers, telescopes, cameras, lights and many other products. These blanks could be produced more efficiently by using these furnaces. Other applications include niche industries such as pizzerias.

Molding glass optical blanks in conventional gas-fired furnaces has been likened to “baking a cake with the oven door open” because about 93% of the energy used is exhausted, and therefore wasted. With the new rotary electric furnace being developed by Advanced Glass Industries, there is no exhaust stack, and thus no waste heat.

Among many other advantages, electric heat can be accurately controlled by computer, improving the efficiency, capacity, and operating cost of the new furnaces. With the new technology, different types of glass can be quickly, accurately, and automatically processed into blanks, replacing reliance on the training and judgment of human operators. These advances will help U.S. glass blank producers regain competitiveness and business that has been lost to overseas producers who use electric equipment and have lower operating costs.

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The number of manufacturers of optical glass blanks in the United States has declined from 30 to only 3 because operator-controlled gas-fired furnaces are not competitive or energy efficient.

OFFICE OF INDUSTRIAL TECHNOLOGIES
ENERGY EFFICIENCY AND RENEWABLE ENERGY • U.S. DEPARTMENT OF ENERGY

Project Description

Goal: The goals of this project are to develop a detailed engineering prototype and conduct tests to formalize process controls and validate performance claims. Testing will include detailed analysis leading to larger-scale tests and, ultimately, to commercial acceptance in the optical lens repressing industry.

In making glass optical blanks, glass is heated just to its softening point and then pressed in a mold. The new technology measures and controls this process precisely. Moreover, heating is accomplished in just the right amount of time—quickly enough to speed production, but slowly enough that the blank is not damaged. Electric heat is also drier than gas heat, minimizing quality problems where glass melts unevenly or sticks to the molds.

Advanced Glass Industries is developing this new technology with the help of a grant funded by the Inventions and Innovation Program through the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- A prototype of the invention was built and tested with several types of glass compositions.

The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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Order # I-GL-680
February 2002